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ABSTRACT

This study was designed to test the effects of choice on the reading comprehension of 92 fifth and sixth grade students. Conducted in an elementary classroom, the test involved having each student read five cloze passages and answer an interest questionnaire about the passages. The experimental variable in this study was choice of topics on a reading task. Children were assigned to either a cued choice, blind choice, or no-choice condition. In the cued choice condition, children chose their reading topics from among alternatives which were clearly labeled. The blind choice condition offered them a choice, but from among alternatives that were in blank folders so that they had no information about the alternatives. The no-choice condition assigned the selections to be read on a random basis. The analysis of central interest in this study was a sex by condition analysis of variance. The performance means were fairly low overall and were similar in magnitude for both sexes. However, the boys in the cued choice condition performed substantially better than the boys in the blind choice and no-choice conditions. The girls had no apparent pattern which could be related to the manipulation of the choice variable. (MKM)

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THE EFFECTS OF CHOICE ON CHILDREN'S READING COMPREHENSION AND ATTITUDES

BY

JANET MARIE BOWERMASTER

B.S., Huntingdon College, 1971

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INTRODUCTION

Little is known about the effects of having students make task selections in school. Still, student choice is being incorporated into a variety of educational approaches (Bull, 1970; Leonard, 1968; Muir, 1970; Silberman, 1971; von Hilsheimer, 1970). The range of choices given to students varies tremendously, from comprehensive choices in an open classroom (Gross & Gross, 1972) to circumscribed choices in a traditional classroom where the students' choices are frequently made from among a few teacher-selected options (Jarolimek, 1967). Regardless of the range of choices provided the expectation seems to be that student choice will produce enhanced motivation and/or improved performance (Ashton-Warner, 1963; Lickona, 1971).

Evidence in the relevant literature suggests that choice does have effects on performance. Mandler and Pearlstone (1966) looked at the effects of choice on concept formation and recall. They gave students a deck of 52 cards on which were printed one of four sets of materials ranging from common English words to random patterns. Individuals in the free condition were asked to sort these cards into any type of groups that they chose and were told that they would later be asked to sort other decks of materials, identical to these but presented in different order, until

they could sort two successive decks in exactly the same way. Being able to sort the cards correctly was taken as evidence that the participants had successfully formed a sorting schema. When the sorting criterion had been reached, each participant was asked to write down as many of the sorted words as he could remember.

Individuals in the constrained condition were also asked to sort a deck of 52 cards, but were told that the experimenter had chosen one particular categorization schema as the correct one and that they should use this schema. The "correct" schema for each student was actually the one used by his counterpart in the free condition to whom he was yoked. The experimenter told the students in the constrained condition how many categories to use and showed them where the cards should go when they placed them incorrectly. They were then asked to continue sorting until they could sort all the cards in the deck with no errors. When they completed the sorting task, the individuals in this condition were also asked to recall the cards they had sorted.

Performance on concept formation was measured in terms of the number of errors and time to sorting criterion. The number of words each student could write from memory comprised his recall score. The results indicated that students in the free condition reached the sorting criterion in significantly fewer trials and with fewer errors than their yoked counterparts in the constrained condition. This was interpreted as

evidence that letting students choose their own conceptual approach facilitates concept formation. No differences were found between groups in the recall of sorted words.

Noy and Hunt (1972) compared the performance effects of a student-directed versus a system-directed approach to learning biographical data about Sigmund Freud. In the student-directed condition, the students were allowed to ask any questions about Freud they liked and were given the answers immediately. This essentially left them free to choose their own method of information gathering and organization. Students in the system-directed condition were yoked to those in the student-directed system so that they received answers to the other person's questions rather than being allowed to choose their own method of information gathering. As a post-test, each participant was asked to answer factual questions about Freud's life and to write a brief essay on his impressions of Freud.

Performance was measured with regard to knowledge acquisition (recall of specific facts), comprehension (number of impressions recorded), and synthesis (integrative complexity of the essay). The results indicated that individuals in the student-directed condition performed significantly better on the measure of knowledge acquisition than did those in the system-directed condition. No significant differences were found between the two conditions in comprehension or synthesis. According to Noy and Hunt, the overall pattern of results

suggested that a student-centered approach in which students chose their own method of information gathering and organization contributed to performance only at the lowest level of the taxonomy.

Myrow (1972) examined the effects of choice on both affective variables and performance. High school students were asked to choose a reading selection from among six offered and, when finished, to respond to affective and achievement items. The six instructional packets used each contained a pretest and instructional materials on a different topic of general interest. These packets were presented in supermarket-like displays with attractive posters advertising the topics. In the choice condition, students were allowed to choose the selection they would read, while in the no choice condition, they were assigned a selection randomly. All students participated in both conditions, half in the choice condition on the first day and the no choice condition on the second day, and half in the no choice condition on the first day and the choice condition on the second.

Three affective measures were included in this study: (1) a general attitude questionnaire consisting of questions on how interesting the task was and how much the students liked it; (2) a measure of personal causation which assessed the degree to which students felt free in the task situation; and (3) a measure of continuing motivation which assessed students' willingness to commit more of their own time to work further on

the task. The results indicated that the participants had significantly more positive feelings about the task in the choice condition than in the no choice condition. The effect of choice on feelings of personal causation was, although not significant, in the direction favoring the choice condition. Finally, the effect of choice on the measure of continuing motivation was significant.

Performance was measured by means of a retention test administered one week after the selections had been read. The results showed no significant differences in retention between the choice and the no choice condition. However, the study had a methodological problem which could have influenced the results. Myrow used a within-subjects design, with every participant being in the choice condition for one trial and in the no choice condition for one trial. An attempt was made to control for order effects by counterbalancing the order in which individuals got each condition. This meant that students who were assigned selections on the first day had only five options to choose from on the second day as opposed to the six options available to those who chose on the first day. Also, it was possible that an individual might randomly be assigned a selection on the first day that he would have chosen on the second day. This would lessen the no choice effect and, since on the second day he would have to choose a selection that was not his first choice, it would also lessen the effect of the choice condition. This

situation could have weakened the manipulation of choice versus no choice.

To summarize, two studies (Mandler and Pearlstone, 1966 and Noy and Hunt, 1972) found significant positive performance effects when individuals were allowed to choose their own method of categorizing and their own organization for knowledge acquisition respectively. One study (Myrow, 1972) found differences on self-reported interest and continuing motivation, but did not find differences in performance between the choice and the no choice conditions. The results of this study, however, may have been influenced by a methodological problem.

There are at least two theoretical approaches which imply that choice would facilitate performance. The first of these is a cognitive-match approach. In Piaget's view, individuals possess certain operative structures which determine the types of cognitive tasks they are capable of performing. The better the match between the cognitive requirements of a given task and the operative structures an individual has, the better that individual would be expected to perform on that task. The effects of choice come into play in Piaget's process of equilibration. Piaget defines equilibration as the interaction between the processes of assimilation and accommodation in response to some environmental situation and contends that it is in this process that an individual makes "an effort to comprehend situations." (Piaget, 1972, p. 325)

A model can be derived from Piaget's conception of the equilibration process which describes how choice might affect the degree to which cognitive match is achieved. According to this model, when the discrepancy of the task from the individual's operative structures is too small, it is assimilated so easily that the situation is not considered significant and the motivation to pursue the task is not aroused. When the task is mildly discrepant, motivation for assimilation is aroused and the new information is assimilated into the operative structures already present. When the task is moderately discrepant, a disequilibrium is created which motivates the individual to accommodate or adapt his structures to include the new information. When the discrepancy is too large, the individual will simply ignore the situation. Thus, it can be hypothesized that when the size of the discrepancy of the task from the individual's level of operative structures is inappropriate, the situation simply lacks significance and the motivation to pursue it is not aroused; i.e., the individual will not choose that task. When he does choose to perform a task, it means that he has the operative structures to deal with it and thus a cognitive match is achieved.

The implication from this model is that an individual's performance should be superior on tasks that he chooses due to the greater possibility of achieving a good cognitive match. We would also expect certain affective results based on this

model. Since the individual chooses only those tasks that he has the structures to handle, he should be successful nearly all the time and this success should reinforce his learning experiences, thus leading to continued motivation and enjoyment of learning activities.

The second theoretical approach is what might be termed the personal control approach. According to de Charms, Man's primary motivational propensity is to be effective in producing changes in his environment. Man strives to be a causal agent, to be the primary locus of causation for, or the origin of, his behavior; he strives for personal causation." (de Charms, 1968, p. 269) If people's behavior conforms to this view, then an individual choosing his own task should have a higher level of motivation than one who is not allowed a choice. This increased motivation should result in a greater degree of engagement with the task which in turn should produce better performance. The critical factor in this approach is having a choice, per se, rather than any cognitive matching which having a choice might provide. Thus, the personal control approach differs from the cognitive-match approach primarily in its prediction that the nature of the alternatives involved in the choice situation is less important--that simply having a choice will produce the desired motivational and performance enhancing effects.

Perlmuter, Monty, and Kimble (1971) examined the effects of choice on paired-associate learning from a

cognitive appropriateness versus an enhanced motivation point of view. Students in the choice condition were shown ten slides with a stimulus word on the left and, on the right, five possible response words from which they were to choose the response they would learn. Of the ten word pairs used, five were of high meaningfulness and five of low meaningfulness. Students in the no choice condition also saw the stimulus word and five response options, but were assigned a response word to learn rather than being allowed to choose one. All participants were given ten paired-associate trials using an A-B list where the stimulus word was shown and they were asked to say the response word aloud. Finally, each person was asked to do ten paired-associate learning trials with an A-C list on which the stimulus words were the same as in the previous trials, but new response words were used which had been chosen by the experimenter. The basic measure of performance was the number of words correct per trial within each level of meaning. The results indicated that having individuals choose their own response words did not facilitate the learning of the A-B word pairs. Furthermore, the choice group seemed to experience an initial period of retardation in learning the A-C list when compared with the no choice group.

The experimenters attributed the choice group's disruption in learning the A-C list to their having formed stronger stimulus associations on the A-B list. In their

opinion, these stronger stimulus associations should have resulted in better performance by the choice group on the A-B list. Since it did not, they suggested that performance differences between the two conditions on the A-B list may have been masked due to the lack of task difficulty. They therefore replicated the study, increasing the rate of presentation of words to increase the task difficulty. The results from this replication showed differences between conditions on the A-B word pairs. For the high-meaning pairs, the choice group did better than the no choice group on early trials with performance equalizing on later trials. On the low-meaning pairs, the choice group maintained its superiority of performance over the no choice group across trials. There were no differences between groups on the A-C list.

Because they got no effect on the A-C list in the replication study, Perlmuter et al conducted a third study. The purpose of this study was to confirm that the effects of choice found earlier were, in fact, due to students having choose response words on the A-B list which had high stimulus associations for them rather than being due to some motivational factor resulting from having had a choice per se. In the third study, the participants chose the response words they would learn on the A-B list, but without prior knowledge of what the stimulus words were. The results indicated no performance differences between groups on either the A-B or the A-C list. The experimenters interpreted the

overall results of these three studies as evidence that the choice of response words did have an effect on paired-associate learning and that this effect was due "to the fact that Ss had the opportunity to select response words which they could easily associate with stimulus words and not simply to having had the opportunity to exercise choice." (Perlmuter, Monty, & Kimble, 1972, p. 52)

The present study was designed to test the differing predictions made by the cognitive match versus personal control approaches. To increase the relevance of the study to school situations, it was conducted in an elementary classroom and the task involved reading. For purposes of generalizability, this would seem to be an improvement upon the Perlmuter et al (1971) study. They used a paired-associate task with college students in a laboratory setting. The Myrow study was done in a school setting and used a reading task. However, methodological difficulties possibly limited the strength of the choice manipulation by causing variations in the choice alternatives presented to different students within the same condition. The present study used a between subjects design to insure that all participants in a given condition were presented with identical choice alternatives.

The experimental variable in this study was choice of topics on a reading task and children were assigned to either the cued choice, blind choice or no-choice conditions. In the cued choice condition, children chose their reading topics

from among alternatives which were clearly labeled. The blind choice condition offered them a choice, but from among alternatives that were in blank folders so that they had no information about the alternatives. The no choice assigned the selections to be read on a random basis.

According to the cognitive match view, the students in condition 1 should outperform those in the other two conditions, since it is only in condition 1 that enough information is supplied about the alternatives for the Piagetian-type mechanism to function. According to the personal control approach, just getting a choice should be motivating enough to increase performance. Thus no difference between conditions 1 and 2 would be predicted, and both conditions should be superior to condition 3. If neither view is valid, children in all three conditions should perform similarly.

METHODS

Subjects

The participants in this study were 42 fifth and 50 sixth grade students in four multi-age elementary school classes in Urbana, Illinois. The children were separated according to sex and grade and were randomly assigned to conditions within each classroom. Table 1 presents the distribution of students by condition.

Design

The design used in this study was a fully crossed, three factor, between subjects, randomized mixed blocks design. The factors were: (1) condition (2) sex and (3) grade. The condition factor had three levels. In condition 1, the cued choice condition, students chose the five passages they would do from among passages whose topics were identified. Participants in condition 2, the blind choice condition, chose their five passages from among the same options as in condition 1, but the topics were not identified prior to the choice. Individuals in condition 3, the no choice condition, were told that passages had already been chosen for them and were randomly assigned passages.

Sex was included as a factor in this design for two reasons. First, the task used in this study was a reading task

TABLE 1

DISTRIBUTION OF SUBJECTS BY GRADE, SEX, AND CONDITION

	Grade 5		Grade 6		
	Boys	Girls	Boys	Girls	Totals
Condition 1	7	7	10	6	30
Condition 2	8	6	8	8	[illegible]
Condition 3	6	8	11	7	[illegible]
	21	21	29	21	92

and there is evidence that elementary age boys read more poorly than girls (Asher and Gottman, 1973; Stroud and Lindquist, 1942). Second, work done by Asher and Markell (1974) suggests that the interest level of reading material affects the sexes differentially. They found that on high interest materials, boys and girls performed equally well, while on materials of low interest, the girls significantly outperformed the boys. In the present study, children in the cued choice condition might select reading passages based on their interest value. This could result in boys showing the effects of having a choice more strongly than girls.

Grade level was not of substantive interest since the children differed in age by only one year. However, it was included in the design due to methodological considerations. Since all the participating classes had fifth- and sixth-grade children together in the same classroom, it was necessary to block according to grade level before randomly assigning students to a condition in order to avoid confounding grade level effects with condition effects.

Materials

The reading material consisted of twenty-five passages from the Britannica Junior Encyclopedia (1968). The passage topics sampled a wide range of content areas and potential student interests. These passages had been used in previous

research by Asher and Markell (1974). They made each passage into a "cloze" passage by deleting the tenth word in the passage and subsequently deleting every 5th word. One sentence with no deletions ended each passage. The cloze task was used to measure reading performance because cloze scores correlate highly with other types of comprehension measures and are simpler and more precise to develop and score (Bormuth, 1967; Rankin, 1969; Taylor, 1953). The passages in this study were controlled in length so that each contained 10 deletions. Since each child received five passages, the range of possible performance scores extended from 0 to 50 (see Appendix I for sample passages).

The affective measure was a six-item quesionnaire (see Appendix II) developed specifically for the purposes of this study. Children responded to each item on a 1-7 rating scale. The questions dealing with the students' interest level and continuing motivation were designed to determine whether the variation in choice conditions would affect only the students feelings about their topics, or whether it would also influence their feelings about the task itself. Thus question 1 asked how interesting the reading passages were (topic) while question 2 dealt with how much the participants enjoyed filling in the missing words (task). Similarly, question 5 asked how much the individual would like to read more about the topics he had today (topic) while question 6 asked how much he would like to do more of the missing words game (task). Questions 3 and 4 asked

children to indicate how much they felt they were origins of their own behavior. Of the six questions, two were worded negatively to help control for any response set due to position on the rating scale.

Procedures

The study was conducted in four classes on three consecutive days of the week. Four young women served as experimenters, two of them for all four classes and two of them for two classes each. Each experimenter was responsible for one condition per class and the conditions were rotated among experimenters across the four sessions so that any possible experimenter effect would be counterbalanced as much as possible. The same experimenter gave the initial instructions to children in each class to assure uniformity in the form and content of the general directions.

In each case, the experimenters entered the classroom as the students were changing classes. They used this opportunity to set up their materials. Three separate stations were used around the room. Each station was used for a particular condition; i.e., to distribute passages in the cued choice, blind choice, or no choice conditions. One station was at each side of the room and one was at the rear. As soon as the students were in their seats and ready to begin, the primary experimenter gave the initial instructions from the front of the room. The instructions were as follows:

Hi! We are here today to try out some new reading materials with you. This is Mrs. _____ and Mrs. _____ and I am Mrs. _____.

First, we want to show you how to do the missing word paragraphs. Mrs. _____ will pass out a sample paragraph. Please don't write on it, just follow along as I read it. As you can see, some words have been left out of the passage and your task will be to try to fill in a word that makes sense there. It will always be only a single word that goes in the blank. Let's go over the sample together to make sure you see how it goes. (The experimenter then read through the sample paragraph giving the correct responses for some blanks and letting the students try to fill in some.) O.K. Any questions? You will be doing five of these paragraphs today.

After you do your paragraphs, we will give you a sheet that has some questions on it about how you felt about what you did. You will answer these questions by using a 1-7 rating scale like the one I have drawn on the board. Let's do some examples to see how to use it. If I asked you how much you liked mud, some of you might say not at all. If you felt this way, you would show it by circling a number here at the lower end of the scale. If I asked you how much you liked ice cream, you might say very much. To show this, you would circle a number here at the high end of the scale. If you don't feel much one way or the other, you would circle a number here near the middle somewhere. Any questions? O.K. Let's try one more to make sure you've got it. If I asked you how much you hated recess, what would you say? O.K., what number would you circle to show me that? Good.

Mrs. _____, Mrs. _____ and I each have a list of names that we will call out one at a time. When your name is called, go up to the person who called it and she will give you further instructions about how to get your paragraphs. While you are waiting for your name to be called, please sit quietly. If you finish before the others, please take out a library book or do some other quiet activity at your seat until every one is through. Thank you.

The experimenters had a list of names of students who had been randomly assigned to their condition. Each experimenter called one student at a time to the station. The three stations ran concurrently so that at any one time there were three children at stations throughout the room.

When a child reported to a choice station, specific directions were given by the experimenter on how to choose their five passages. The passages were kept in manilla folders. Condition 1 had printed titles and large color photographs on the front to identify the topic of the passages inside. Conditions 2 and 3 had the passages in totally blank folders. The passages on twenty-five different topics were presented to the participants in the five sets of five shown in Table 2. Each child got one passage from each set of five. The topics included in each set were the same for all students to insure that each child's choices involved the same options. However, the order of presentation of the sets and the position of topics within sets were completely randomized to avoid any order effects or response sets with regard to the position of topics in a choice display. Each experimenter had a sheet for each individual assigned to her station. The sheets listed the specific order of presentation of sets and topics for each child (see Appendix III for sample assignment sheet). The first five folders were laid in a row on the table at the station and the following instructions were given:

Condition 1

> Hi, (first name) I want you to look at the pictures on these folders and choose one that you would like to read about. Then open that folder and take out one of the paragraphs. We are going to do this five times so you will have five paragraphs at the end. OK?

TABLE 2

LISTING OF TOPICS BY SET

Set 1

1 - forest
2 - astronaut
3 - model trains
4 - jet airplane
5 - maps

Set 2

1 - canoe
2 - skiing
3 - monkey
4 - circus
5 - priest

Set 3

1 - cats
2 - insects
3 - marionettes
4 - basketball
5 - bride

Set 4

1 - calf
2 - flowers
3 - food
4 - bullfighting
5 - painting

Set 5

1 - mother and child
2 - butterflies
3 - livingroom
4 - dogs
5 - race cars

Condition 2

Hi, (first name) I want you to choose one of these folders, open it, and take out a paragraph to read. We'll do this five times so you will have five paragraphs at the end. OK?

Condition 3

Hi, (first name) I have some folders with paragraphs in them. We've already chosen the paragraphs we want you to read today and I will show you which ones they are when I lay them out. You will have five paragraphs at the end. OK?

As soon as the student had his first passage, the experimenter picked up that set of folders and laid down the next set. This continued for five sets. When a child had all five of his passages, the experimenter presented the attitude questionnaire with these instructions:

> Here are some questions about how you felt about your paragraphs. Please do all your paragraphs before you answer these questions. When you are finished, take out your library book and read quietly.

The child then returned to his seat to begin work and the next person on the list was called. When all participants had received their materials, the experimenters moved around the room to insure quiet and to pick up the materials as children finished.

One hour was allotted for each session. The explanation took 10 minutes and the distribution of materials took 15 minutes. This meant that the first child to receive materials in each condition had 50 minutes to work and each succeeding child had slightly less time. The child in each condition who got his materials last had 35 minutes to complete the task. Since the average child finished in approximately 15 minutes, each child had sufficient time to complete the task.

RESULTS

Performance Measure

Performance was measured by counting the number of correct word replacements in the cloze passages. Each participant received five cloze passages with ten blanks in each passage, thus resulting in a possible range of scores from 0 to 50. All passages were scored by the primary experimenter and, as is traditionally done, only the exact words that had been deleted from the original paragraphs were accepted as correct responses. Accepting synonyms tends to increase the cloze scores slightly, but not influence the distribution of scores nor improve the validity of the measure (Rankin, 1967).

The first analysis performed was a Grade by Sex by Condition (2 x 2 x 3) analysis of variance. It was intended as a preliminary analysis to determine whether the data could be pooled across grade level. Grade level was not of substantive interest in this study but had been included as a factor to avoid confounding grade level effects with condition effects. The results of this analysis are summarized in Appendix III. Since neither the main effect for grade level $F(1, 80) = 2.10$, nor the interaction of grade with any other factor was found to be significant, the data were pooled across grade level.

Another preliminary analysis was performed due to a methodological problem that arose. In two of the four classrooms, the students were used to moving freely about the room and, despite efforts by the experimenters, some students did not remain seated while the experimental session was underway. As a result, some students became aware of the various choice conditions being employed and their performance may have been affected by the knowledge that different groups of students were being treated differently. The means and stardard deviations by group are presented in Appendix V. To check for effects due to movement a Class by Sex by Condition (2 x 2 x 3) analysis of variance was run. The classroom factor had two levels: classroom where movement did versus did not occur. The results of this analysis are presented in Appendix VI. Neither the main effect for class $F(1, 80) = .09$, nor the interaction of class with condition $F(2, 80) = .61$, was significant, so the data were pooled across class.

The analysis of central interest in this study was a Sex by Condition (2 x 3) analysis of variance. As can be seen in Table 3, the performance means were fairly low overall and were similar in magnitude for both sexes. However, the means for the boys were in a direction consistent with choice effects while the means for the girls were not. That is, the boys in the cued choice condition performed substantially better than the boys in the blind choice and no choice conditions. The girls had no apparent pattern which could be related to the manipulation of the choice variable. The results of the analysis of variance in Table 4 show a marginally significant sex by

TABLE 3

MEANS AND STANDARD DEVIATIONS OF
CHILDREN'S CLOZE SCORES

	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Boys	17.94	7.14	14.31	6.49	13.29	5.87
Girls	11.30	4.50	14.93	6.05	13.80	8.57

TABLE 4

SEX BY CONDITION ANALYSIS OF VARIANCE
ON CHILDREN'S CLOZE SCORES
SUMMARY TABLE

Source	DF	SS	MS	F	P
sex	1	76.87	76.87	1.72	ns
condition	2	23.41	11.71	.26	ns
sex x condition	2	262.01	131.01	2.94	<.06
error	86	3836.01	44.61		

condition interaction, $F(2,86) = 2.94$, $P < .06$, but no significant main effect for sex, $F(1,86) = 1.72$, or for condition, $F(2,86) = .26$. This seems to suggest that having a choice of topics somehow had effects on the boys but not the girls.

A main effect for condition had been expected and since it did not appear, a validity check was undertaken to ascertain whether the manipulation of the choice variable had been effective. It had been assumed that the participants in condition 1, who had had information about the available topics before choosing the ones they wanted to read, would get more interesting topics than the participants in conditions 2 and 3, who got their topics by random choice. If this were not the case, we might suspect that the random assignment of topics in conditions 2 and 3 had resulted in a spuriously high level of topic interest, thus precluding a fair test of the central hypotheses. The validity check, then, consisted of computing the mean interest level of the passages read by each participant and subjecting these data to a Sex by Condition (2 x 3) analysis of variance.

The interest ratings used in this procedure were taken from Asher and Markell (1975) and are presented in Appendix VII. Asher and Markell obtained these ratings by showing photographs on various topics to groups of boys and girls and asking them to rate the interest of each picture on a 1-7 scale. Thus for each picture, or topic, an average rating

was obtained from boys and girls. It was possible to use these ratings in the present study since the same set of 25 pictures and topics were employed here. As can be seen from Table 5, the means for both sexes were ordered from high in condition 1 to low in condition 3, indicating that the students in the cued choice condition actually got more interesting topics overall than the students in the other two conditions. Further, Table 6 shows that the main effect for condition was highly significant $F(2,86) = 13.04$, $p < .001$. It thus appears that the manipulation of the experimental variable was successful.

Another subsidiary test of a different nature was performed due to a question regarding the difficulty level of the cloze materials used. The average cloze score on the passages used in this study was 14 out of 50, for an accuracy rate of 28 per cent. This is substantially lower than the 38 per cent correct rate sometimes suggested as being indicative of an appropriate difficulty level (Bormuth, 1967). If the cloze materials were too difficult for the age level of the students participating in this study, the range of scores could have been so restricted as to obscure any effects on performance attributable to choice conditions. In an attempt to determine whether any performance effects could have been masked by the difficulty of the passages, a Sex by Condition (2 x 3) analysis of variance was performed using the number of blanks a student attempted to fill as the

TABLE 5

MEANS AND STANDARD DEVIATIONS
OF INTEREST DATA

	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Boys	5.34	.40	4.92	.42	4.85	.38
Girls	4.75	.39	4.47	.43	4.45	.39

TABLE 6

SEX BY CONDITION ANALYSIS OF VARIANCE ON
CHILDREN'S INTEREST DATA
SUMMARY TABLE

Source	DF	SS	MS	F	P
sex	1	5.37	5.37	49.59	<.001
condition	2	2.83	1.41	13.04	<.001
sex x condition	2	.14	.07	.65	ns
error	86	9.32	.11		

dependent variable. As can be seen from Table 7, both the boys and the girls had higher means in condition 1 than in the other two conditions and the results of the analysis of variance in Table 8 show the main effect for condition to be suggestive of a possible trend, $F(2,86) = 2.63$, $p < .08$. This suggests that the students may have been motivated to try harder in the cued choice than in the blind choice and the no choice conditions. It would seem, then, that the failure of the girls to perform better in condition 1 than in the other two conditions leaves open the possibility that performance differences could have been masked by the difficulty of the cloze task.

From the two previous measures (cloze accuracy and number of items attempted), it is possible to derive a measure of the percentage of items attempted that children got correct. It is conceivable that there were systematic variations in the way children approached the cloze task. However, the means and standard deviations in Table 9 and the results of a Sex by Condition (2 x 3) analysis of variance in Table 10 suggest that children did not differ in their strategies as a function of sex or condition.

Affective Measure

The affective measure was a six item questionnaire concerned with how the students felt about their specific reading topics and about the cloze task in general. The

TABLE 7

MEANS AND STANDARD DEVIATIONS OF
THE NUMBER OF BLANKS ATTEMPTED

	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Boys	44.94	9.01	37.06	8.96	38.00	10.12
Girls	40.00	9.22	38.86	9.77	33.67	12.82

TABLE 8

SEX BY CONDITION ANALYSIS OF VARIANCE ON THE
NUMBER OF BLANKS ATTEMPTED
SUMMARY TABLE

Source	DF	SS	MS	F	P
sex	1	141.58	141.58	1.07	ns
condition	2	697.65	348.83	2.63	<.08
sex x condition	2	210.78	105.39	.79	ns
error	86	11408.93	132.66		

TABLE 9

MEANS AND STANDARD DEVIATIONS OF CHILDREN'S PER CENT CORRECT OF ITEMS ATTEMPTED

	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Boys	38.52%	16.45	38.94%	12.58	33.12%	17.72
Girls	28.88%	10.24	38.53%	13.46	38.56%	16.66

TABLE 10

SEX BY CONDITION ANALYSIS OF VARIANCE ON CHILDREN'S PER CENT CORRECT OF ITEMS ATTEMPTED SUMMARY TABLE

Source	DF	SS	MS	F	P
sex	1	3.54	3.54	.02	ns
condition	2	25.54	12.77	.06	ns
sex x condition	2	57.79	28.90	.14	ns
error	86	19226.84	211.50		

responses for each item was indicated on a 1-7 rating scale and these ratings were subjected to a series of Sex by Condition (2 x 3) analyses of variance. The results of these analyses for Questions 1-6 are presented in Apendix VIII.

As can be seen, the only effect to reach significance was the main effect for sex $F(1,86) = 4.04$, $p < .05$ in Question 2 (How much did you enjoy filling in the missing words?). However, there were a total of 18 possible effects (three possible effects on each of the six questions) and one effect could have reached significance by chance. Therefore, little importance can be attached to this particular finding.

Despite the lack of significance differences, it may be instructive to examine the data in some detail. The means by sex and condition for Questions 1-6 are presented in Table 9. It was surprising that only the boys' ratings for Question 1 were in the same direction as the interest data means. This means that although the Asher and Markell ratings indicate that the girls in condition 1 got passages with higher interest ratings than the girls in conditions 2 and 3, the girls in condition 1 did not report higher levels of interest on the affective questionnaire.

The patterns of means for the boys were much more consistent across questions and were more reflective of their performance means than was the case for the girls. The boys in condition 1 got more interesting passages, attempted to fill

TABLE 11

MEANS AND STANDARD DEVIATIONS OF CHILDREN'S AFFECTIVE RESPONSES

BOYS

	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Question 1	4.65	1.88	4.00	1.90	3.41	1.91
Question 2	2.94	1.55	2.94	2.11	2.35	1.68
Question 3	4.76	2.10	4.31	1.99	4.76	2.31
Question 4	4.47	2.06	4.69	1.96	4.29	2.14
Question 5	4.12	2.05	3.13	2.18	3.47	2.57
Question 6	3.71	2.05	3.56	1.90	3.29	2.27

GIRLS

	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Question 1	3.77	2.19	3.50	2.13	4.33	2.15
Question 2	3.92	2.37	3.29	1.87	3.53	1.96
Question 3	5.31	1.38	4.86	1.85	5.07	2.29
Question 4	5.38	1.64	5.00	2.10	4.20	2.20
Question 5	3.77	2.26	3.50	1.95	4.00	2.10
Question 6	3.38	2.27	3.50	2.29	3.73	2.57

more blanks, and scored higher than the boys in conditions 2 and 3. Table 10 shows that the boys in condition 1 also responded more positively than the other boys to five of the six questions on the affective questionnaire. The girls in condition 1, on the other hand, while getting more interesting passages and attempting to fill more blanks than the girls in conditions 2 and 3, had the lowest performance score of any of the groups in this study. On the affective questionnaire, the girls in condition 1 responded more positively than the girls in the other conditions on only half of the six questions. On the other half, the girls in condition 3 responded most positively. It would appear, from the contrasting patterns of means for the sexes, that the boys showed the effects of choice more strongly than the girls.

DISCUSSION

The results of this study suggest that letting children choose their topics on a reading task has stronger effects for boys than for girls. The performance means found for boys were in the direction predicted by the cognitive match approach described earlier. However, this pattern did not occur for girls and the cognitive match approach offers no basis for explaining sex differences.

It is possible that the sex by condition interaction found here could be explained by the findings of Asher and Markell (1974) regarding sex differences and interest level in reading. They found that boys performed significantly better on high interest than on low interest material, while girls did about equally well on both. This led them to conclude that boys are more strongly influenced than girls by the interest level of reading materials. An interpretation along these lines could account both for the boys' performance pattern and for sex differences in performance. The boys would have done better in condition 1 than in the other two conditions because the topics of the reading passages were significantly more interesting in condition 1. The performance pattern for the girls would have been different because they are generally less susceptible to fluctuations in performance related to the interest level of the materials involved.

This line of thinking does not fit with every aspect of the present findings. It does not, for example, explain why the girls' performance mean was lower in condition 1 than in conditions 2 and 3. It does, however, seem to fit the total data picture of this study better than the choice mechanism approaches proposed by the author.

In spite of these results, it seems premature to discard the hypothesis that choice has positive effects on performance and affective variables. The literature review for this paper included studies which found positive effects for choice on both types of variables and the general consensus among educators seems to be that choice does have such effects. There are several possible methodological difficulties in the present study which would account for the lack of significant findings with regard to the choice variable.

First, there could have been problems with the materials used to measure performance. The lower than usual per cent of correct responses for the group as a whole suggested that the reading level of the cloze passages may have been too difficult for the students participating in this study. This problem was examined by performing a Sex by Condition (2 x 3) analysis of variance using the number of blanks attempted as the dependent variable and comparing this to the analysis of the cloze scores. This procedure revealed a discrepancy between the patterns of means in the two analyses and left open

the possibility that performance differences could have been masked by the difficulty of the cloze materials used.

Another aspect of the materials that could have diminished the choice effect was the possible discrepancy between the interest level of the pictures depicting the passage topics in condition 1 and the passages themselves. The pictures were large, colorful photographs which may have led students to expect more exciting reading than the Encyclopedia Brittanica Junior excerpts provided. Feelings of disappointment could have resulted from this discrepancy and could have worked to counteract any positive feelings due to choice. If this were the case, it would explain why the results of the affective questionnaire showed no differences between conditions on topic interest while the analysis using Asher and Markell's average ratings of topic interest found highly significant differences by condition. The interest ratings from Asher and Markell (1975) were obtained by showing slides of the pictures used to identify the passage topics in the present study to groups of boys and girls and asking them to rate how interesting the topics were. The ratings of the affective questionnaire in this study were done after the participants had both seen the pictures and read the passages. It thus appears, in keeping with the discrepancy interpretation, that there were significant differences in the interest level of the topics by condition when only the pictures were used but that the differences disappeared after the participants had read the passages.

A second area of possible methodological difficulty could have been in the manipulation of the choice variable. Certainly, since everyone in the class was expected to participate, the whole flavor of the experimental session may have been predominantly non-choice. If this were the case, the general non-choice aspect may have overshadowed the smaller choices offered in conditions 1 and 2 and nullified the expected choice effects.

Another aspect of the choice manipulation which could have been a problem was the nature of the choice offered in condition 2. Condition 2 was designed so that students would choose from among five blank folders to get each of their reading passages, thus giving them a choice without providing any information about the alternatives. Because of the totally blind nature of the choice, it is possible that it may have been perceived by the participants as being equivalent to a no choice rather than a limited choice situation.

Finally, a major difficulty may have centered on the task itself. In the process of narrowing the task to improve experimental control, some critical aspect of the choice situation which produces the expected effects may have been excluded. Offering the students a choice among various tasks would probably improve upon the present study in this regard by broadening the choice situation and thus increasing the liklihood of including the critical variables. The optimal situation, of course, for insuring the inclusion of all

critical variables would be to conduct choice research in naturalistic settings. However, this approach represents the opposite end of the methodological continuum from the present study and involves myriad problems of experimental control which would have to be resolved before any definitive results could be expected.

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Appendix I

Sample Passages

FLOWERS

The nectar of flowers is used by the bees _____ the manufacture of honey. _____ the principal value of _____ to man is for _____ and the fruits which _____ them. Great business enterprises _____ with seeds, the breeding _____ young plants in nurseries, _____ the sale of trees, _____, and flowering plants as _____ as cut flowers. Florists are able to produce blooming plants all year round by planting in greenhouses and through artificial forcing.

MAPS

A map is a drawing or picture of the _____ or a part of _____ surface as seen from _____. A map, however, is _____ from a photograph in _____ ways. A photograph shows _____ just the way they _____ whereas a map uses _____ to represent land features _____ places. A map is _____ to scale so that distances and directions are true. Furthermore, a map can show a country, a continent, or the whole world, something that cannot be done well by a photograph.

Appendix I (continued)

PAINTING

The art of painting is as old as mankind. _____ caves, where early man _____ many thousands of years _____, there have been discovered _____ of animals as lifelike _____ any that have been _____ in the whole history _____ art. These were made _____ the people of the _____ Stone Age of Europe. _____ they thought there was some sort of magic in picturing the animals they used for food and clothing, that by doing so they would be lucky in the hunt. Primitive peoples today like to decorate their pottery and clothing, even their bodies, with colors and designs.

CANOE

One of the earliest craft in which men set _____ on seas and rivers _____ the canoe, a hollow _____ driven and steered with _____ paddle which the sailor _____ in both hands while _____ sat or knelt facing _____ direction in which he _____ going. The most primitive _____ of canoe was shaped _____ a large bowl, and made of a framework of wood covered with skins or wickerwork waterproofed with pitch. These round boats are still used by natives on the Euphrates River and may be seen on some of the rivers of Wales.

Appendix II

Affective Questionnaire

Name _____

We are interested in how you felt about the task you just finished. The following questions concern your reactions to the task. Please read each question carefully and mark the number on the scale which best describes your feelings.

1. How interesting were your reading passages?

1	2	3	4	5	6	7
not very much						very much

2. How much did you enjoy filling in the missing words?

1	2	3	4	5	6	7
not very much						very much

3. How much was this work a waste of time?

1	2	3	4	5	6	7
not very much						very much

4. How much were you made to do something you really did not want to do?

1	2	3	4	5	6	7
not very much						very much

5. How much would you like to read more about the topics you had today?

1	2	3	4	5	6	7
not very much						very much

6. How much would you like to do more of the missing words game?

1	2	3	4	5	6	7
not very much						very much

Appendix III

Sample Assignment Sheet

Experimenter: Sue

Teacher: Brown

Condition: 2

Subject: Susan Shaw

Choice 1	51	52	54	55	53
Choice 2	43	42	44	41	45
Choice 3	32	34	35	33	31
Choice 4	12	13	15	11	14
Choice 5	22	21	25	23	24

Appendix IV

Grade by Sex by Condition Analysis of Variance on Children's Cloze Scores

Summary Table

Source	DF	SS	MS	F	P
grade	1	95.28	95.28	2.10	ns
sex	1	64.66	64.66	1.43	ns
condition	2	48.54	24.27	.54	ns
grade x sex	1	12.99	12.99	.29	ns
grade x condition	2	55.50	27.75	.61	ns
sex x condition	2	253.44	126.72	2.80	<.07
grade x sex x condition	2	19.75	9.87	.22	ns
error	80	3622.07	45.28		

Appendix V

Means and Standard Deviations of Children's Cloze Scores

	Classes Where Movement Did Occur					
	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Boys	17.75	7.02	10.20	6.51	11.20	5.77
Girls	12.63	4.68	17.33	5.92	13.38	8.43

	Classes Where Movement Did NOT Occur					
	Condition 1		Condition 2		Condition 3	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Boys	18.11	7.46	18.00	6.70	14.80	5.83
Girls	9.20	4.61	10.60	6.11	14.29	8.54

Appendix VI

Class by Sex by Condition Analysis of Variance on Children's Cloze Scores

Summary Table

Source	DF	SS	MS	F	P
class	1	3.79	3.79	.09	ns
sex	1	95.98	95.98	2.27	ns
condition	2	14.85	7.43	.18	ns
class x sex	1	265.07	265.07	6.28	<.02
class x condition	2	51.83	25.91	.61	ns
sex x condition	2	264.07	132.04	3.13	<.05
class x sex x condition	2	154.34	77.17	1.83	ns
error	80	3375.57	42.20		

Appendix VII

Interest Ratings for Cloze Passage Topics From Asher and Markell (1975)

Topic	Interest Rating	
	Girls	Boys
Forest	4.41	4.59
Jet airplane	3.59	5.18
Priest	4.92	3.81
Dog	4.72	5.41
Astronaut	4.08	6.24
Bride	4.62	2.34
Calf	5.14	4.91
Basketball players	4.31	5.85
Butterflies	4.87	3.97
Marionettes	4.79	4.21
Monkey	4.48	5.32
Flowers	4.18	4.01
Bullfighting	4.62	5.46
Skiing	5.10	5.87
Food	5.42	5.87
Living room	4.65	4.10
Map	2.76	3.88
Painting	4.87	4.54
Circus	5.75	5.34
Race cars	3.59	6.41
Canoe	4.62	6.09
Model trains	3.58	3.90
Mother and child	4.61	4.03
Insect	3.32	3.69
Cat	5.61	5.12

Appendix VIII

Sex by Condition Analysis of Variance on Children's Affective Responses

Summary Tables

Question 1

(How interesting were your reading passages?)

Source	DF	SS	MS	F	P
sex	1	.53	.53	.12	ns
condition	2	3.42	1.71	.39	ns
sex x condition	2	13.67	6.83	1.57	ns
error	86	375.14	4.36		

Question 2

(How much did you enjoy filling in the missing words?)

Source	DF	SS	MS	F	P
sex	1	15.95	15.95	4.04	<.05
condition	2	3.75	1.87	.48	ns
sex x condition	2	2.87	1.43	.36	ns
error	86	339.28	3.95		

Question 3

(How much was this work a waste of time?)

Source	DF	SS	MS	F	P
sex	1	4.89	4.89	1.02	ns
condition	2	3.32	1.66	.35	ns
sex x condition	2	.30	.15	.03	ns
error	86	410.97	4.78		

Appendix VIII
(continued)

Question 4

(How much were you made to do something you really did not want to do?)

Source	DF	SS	MS	F	P
sex	1	3.25	3.25	.73	ns
condition	2	8.36	4.18	.94	ns
sex x condition	2	3.91	1.95	.44	ns
error	86	380.68	4.43		

Question 5

(How much would you like to read more about the topics you had today?)

Source	DF	SS	MS	F	P
sex	1	.78	.78	.15	ns
condition	2	6.28	3.14	.61	ns
sex x condition	2	3.34	1.67	.32	ns
error	86	445.56	5.18		

Question 6

(How much would you like to do more of the missing words game?)

Source	DF	SS	MS	F	P
sex	1	.01	.01	.002	ns
condition	2	.02	.01	.002	ns
sex x condition	2	2.27	1.14	.22	ns
error	86	434.51	5.05		